



US006024902A

United States Patent [19]**Maus et al.**[11] **Patent Number:** **6,024,902**[45] **Date of Patent:** **Feb. 15, 2000**

[54] **INJECTION MOLDED PAIRED
THERMOPLASTIC SPECTACLE LENSES
SUITED FOR FULLY AUTOMATED DIP
HARDCOATING**

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Heights, Minn.**

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[21] Appl. No.: **09/009,151**

[22] Filed: **Jan. 20, 1998**

Primary Examiner—Hung Xuan Dang

Related U.S. Application Data

[62] Division of application No. 08/795,903, Feb. 5, 1997, Pat.
No. 5,750,060, which is a division of application No.
08/795,613, Feb. 5, 1997, Pat. No. 5,750,156, which is a
division of application No. 08/533,126, Sep. 25, 1995, Pat.
No. 5,718,849.

[51] **Int. Cl.⁷** **B29D 11/00**

[52] **U.S. Cl.** **264/40.5; 264/2.2; 264/2.3**

[58] **Field of Search** **351/41, 158, 44;
264/40.5, 2.2, 2.3, 1.1; 428/8.08**

[57] ABSTRACT

Plastic injection-compression multi-cavity molding of flash-free improved-cleanliness thermoplastic spectacle lenses (16) are suitable to be robotically dip hardcoated. Special spring-loaded (25, 26) molds having variable-volume mold cavities are used in an injection-compression molding process to form, without parting line flash, pairs of a wide range of differing optical power of polycarbonate Rx spectacle lenses (16). These pairs have special molded-on design features which are specially suited for full automation, starting with a novel way for ejection out of the mold into a takeout robot which is integrated via full automation with subsequent dip hardcoating. A molded-on tab with each pair of lenses is specially suited for manipulation by SCARA type robot. This combination produces micro-clean hardcoated paired molded lens made entirely within a single continuous cleanroom air enclosure surrounding the lenses, without any human operators therein, nor requiring any cutting or trimming of the molded paired lens or runner system before hardcoating, nor use of Freon (tm) CFC nor aqueous cleaning protocols before dipcoating.

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18 Claims, 8 Drawing Sheets